SEQUENCE LISTING

(1) GENERAL INFORMATION:

    (i) APPLICANT:
        (A) NAME: Novartis AG
        (B) STREET: Schwarzwaldallee 215
        (C) CITY: Basel
        (E) COUNTRY: Switzerland
        (F) POSTAL CODE (ZIP): 4058
        (G) TELEPHONE: +41 61 696 11 11
        (H) TELEFAX: + 41 61 696 79 76
        (I) TELEX: 962 991

    (ii) TITLE OF INVENTION: 2'-Substituted nucleosides and
           oligonucleotide derivatives

   (iii) NUMBER OF SEQUENCES: 22

    (iv) COMPUTER READABLE FORM:
        (A) MEDIUM TYPE: Floppy disk
        (B) COMPUTER: IBM PC compatible
        (C) OPERATING SYSTEM: PC-DOS/MS-DOS
        (D) SOFTWARE: PatentIn Release #1.0, Version #1.30 (EPO)

(2) INFORMATION FOR SEQ ID NO: 1:

    (i) SEQUENCE CHARACTERISTICS:
        (A) LENGTH: 20 base pairs
        (B) TYPE: nucleic acid
        (C) STRANDEDNESS: single
        (D) TOPOLOGY: linear

    (ii) MOLECULE TYPE: mRNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 1:

AAUGCAUGUC ACAGGCGGGA   20

(2) INFORMATION FOR SEQ ID NO: 2:

    (i) SEQUENCE CHARACTERISTICS:
        (A) LENGTH: 20 base pairs
        (B) TYPE: nucleic acid
        (C) STRANDEDNESS: single
        (D) TOPOLOGY: linear

    (ii) MOLECULE TYPE: other nucleic acid
        (A) DESCRIPTION: /desc = "oligonucleotide"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 2:

TCCCGCCTGT GACATGCATT   20

(2) INFORMATION FOR SEQ ID NO: 3:

    (i) SEQUENCE CHARACTERISTICS:
        (A) LENGTH: 15 base pairs
        (B) TYPE: nucleic acid
        (C) STRANDEDNESS: single
        (D) TOPOLOGY: linear

    (ii) MOLECULE TYPE: other nucleic acid
        (A) DESCRIPTION: /desc = "oligonucleotide"

(ix) FEATURE:

    (A) NAME/KEY: misc_feature

    (B) LOCATION:5

    (D) OTHER INFORMATION:/note= "2'-substituted sugar"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 3:

TTTTTCTCTC TCTCT   15

(2) INFORMATION FOR SEQ ID NO: 4:

    (i) SEQUENCE CHARACTERISTICS:

        (A) LENGTH: 15 base pairs

        (B) TYPE: nucleic acid

        (C) STRANDEDNESS: single

        (D) TOPOLOGY: linear

    (ii) MOLECULE TYPE: other nucleic acid

        (A) DESCRIPTION: /desc = "oligonucleotide"

    (ix) FEATURE:

        (A) NAME/KEY: misc_feature

        (B) LOCATION:5

        (D) OTHER INFORMATION:/note= "2'-substituted sugar"

    (ix) FEATURE:

        (A) NAME/KEY: misc_feature

        (B) LOCATION:7

        (D) OTHER INFORMATION:/note= "2'-substituted sugar"

    (ix) FEATURE:

        (A) NAME/KEY: misc_feature

        (B) LOCATION:9

        (D) OTHER INFORMATION:/note= "2'-substituted sugar"

(ix) FEATURE:

    (A) NAME/KEY: misc_feature

    (B) LOCATION:11

    (D) OTHER INFORMATION:/note= "2'-substituted sugar"

(ix) FEATURE:

    (A) NAME/KEY: misc_feature

    (B) LOCATION:13

    (D) OTHER INFORMATION:/note= "2'-substituted sugar"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 4:

TTTTTCTCTC TCTCT   15

(2) INFORMATION FOR SEQ ID NO: 5:

    (i) SEQUENCE CHARACTERISTICS:

        (A) LENGTH: 16 base pairs

        (B) TYPE: nucleic acid

        (C) STRANDEDNESS: single

        (D) TOPOLOGY: linear

    (ii) MOLECULE TYPE: other nucleic acid

        (A) DESCRIPTION: /desc = "oligonucleotide"

    (ix) FEATURE:

        (A) NAME/KEY: misc_feature

        (B) LOCATION:1

        (D) OTHER INFORMATION:/note= "2'-substituted sugar"

    (ix) FEATURE:

        (A) NAME/KEY: misc_feature

        (B) LOCATION:7

        (D) OTHER INFORMATION:/note= "2'-substituted sugar"

(ix) FEATURE:

    (A) NAME/KEY: misc_feature

    (B) LOCATION:9

    (D) OTHER INFORMATION:/note= "2'-substituted sugar"

(ix) FEATURE:

    (A) NAME/KEY: misc_feature

    (B) LOCATION:15

    (D) OTHER INFORMATION:/note= "2'-substituted sugar"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 5:

TCCAGGTGTC CGCATC   16

(2) INFORMATION FOR SEQ ID NO: 6:

    (i) SEQUENCE CHARACTERISTICS:

        (A) LENGTH: 15 base pairs

        (B) TYPE: nucleic acid

        (C) STRANDEDNESS: single

        (D) TOPOLOGY: linear

    (ii) MOLECULE TYPE: other nucleic acid

        (A) DESCRIPTION: /desc = "oligonucleotide"

    (ix) FEATURE:

        (A) NAME/KEY: misc_feature

        (B) LOCATION:1..5

        (D) OTHER INFORMATION:/note= "2'-substituted sugar"

    (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 6:

TTTTTCTCTC TCTCT   15

(2) INFORMATION FOR SEQ ID NO: 7:

    (i) SEQUENCE CHARACTERISTICS:
        (A) LENGTH: 15 base pairs
        (B) TYPE: nucleic acid
        (C) STRANDEDNESS: single
        (D) TOPOLOGY: linear

   (ii) MOLECULE TYPE: other nucleic acid
        (A) DESCRIPTION: /desc = "oligonucleotide"

   (ix) FEATURE:
        (A) NAME/KEY: misc_feature
        (B) LOCATION:5
        (D) OTHER INFORMATION:/note= "2'-substituted sugar"

   (ix) FEATURE:
        (A) NAME/KEY: modified_base
        (B) LOCATION:6
        (D) OTHER INFORMATION:/mod_base= OTHER
            /note= "5-methylcytosine"

   (ix) FEATURE:
        (A) NAME/KEY: misc_feature
        (B) LOCATION:6
        (D) OTHER INFORMATION:/note= "2'-substituted sugar"

   (ix) FEATURE:
        (A) NAME/KEY: misc_feature
        (B) LOCATION:7
        (D) OTHER INFORMATION:/note= "2'-substituted sugar"

   (ix) FEATURE:
        (A) NAME/KEY: modified_base
        (B) LOCATION:8
        (D) OTHER INFORMATION:/mod_base= OTHER

/note= "5-methylcytosine"

(ix) FEATURE:

    (A) NAME/KEY: misc_feature

    (B) LOCATION:8

    (D) OTHER INFORMATION:/note= "2'-substituted sugar"

(ix) FEATURE:

    (A) NAME/KEY: misc_feature

    (B) LOCATION:9

    (D) OTHER INFORMATION:/note= "2'-substituted sugar"

(ix) FEATURE:

    (A) NAME/KEY: modified_base

    (B) LOCATION:10

    (D) OTHER INFORMATION:/mod_base= OTHER

        /note= "5-methylcytosine"

(ix) FEATURE:

    (A) NAME/KEY: misc_feature

    (B) LOCATION:10

    (D) OTHER INFORMATION:/note= "2-substituted sugar"

(ix) FEATURE:

    (A) NAME/KEY: misc_feature

    (B) LOCATION:11

    (D) OTHER INFORMATION:/note= "2-substituted sugar"

(ix) FEATURE:

    (A) NAME/KEY: modified_base

    (B) LOCATION:12

    (D) OTHER INFORMATION:/mod_base= OTHER

        /note= "5-methylcytosine"

(ix) FEATURE:

    (A) NAME/KEY: misc_feature

    (B) LOCATION:12

(D) OTHER INFORMATION:/note= "2'-substituted sugar"

(ix) FEATURE:

    (A) NAME/KEY: misc_feature

    (B) LOCATION:13

    (D) OTHER INFORMATION:/note= "2'-substituted sugar"

(ix) FEATURE:

    (A) NAME/KEY: modified_base

    (B) LOCATION:14

    (D) OTHER INFORMATION:/mod_base= OTHER

        /note= "5-methylcytosine"

(ix) FEATURE:

    (A) NAME/KEY: misc_feature

    (B) LOCATION:14

    (D) OTHER INFORMATION:/note= "2-substituted sugar"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 7:

TTTTTCTCTC TCTCT   15

(2) INFORMATION FOR SEQ ID NO: 8:

    (i) SEQUENCE CHARACTERISTICS:

        (A) LENGTH: 15 base pairs

        (B) TYPE: nucleic acid

        (C) STRANDEDNESS: single

        (D) TOPOLOGY: linear

    (ii) MOLECULE TYPE: other nucleic acid

        (A) DESCRIPTION: /desc = "oligonucleotide"

    (ix) FEATURE:

        (A) NAME/KEY: misc_feature

            (B) LOCATION:1..14

            (D) OTHER INFORMATION:/note= "2'-substituted sugar"

    (ix) FEATURE:

            (A) NAME/KEY: modified_base

            (B) LOCATION:6

            (D) OTHER INFORMATION:/mod_base= OTHER

                    /note= "5-methylcytosine"

    (ix) FEATURE:

            (A) NAME/KEY: modified_base

            (B) LOCATION:8

            (D) OTHER INFORMATION:/mod_base= OTHER

                    /note= "5-methylcytosine"

    (ix) FEATURE:

            (A) NAME/KEY: modified_base

            (B) LOCATION:10

            (D) OTHER INFORMATION:/mod_base= OTHER

                    /note= "5-methylcytosine"

    (ix) FEATURE:

            (A) NAME/KEY: modified_base

            (B) LOCATION:12

            (D) OTHER INFORMATION:/mod_base= OTHER

                    /note= "5-methylcytosine"

    (ix) FEATURE:

            (A) NAME/KEY: modified_base

            (B) LOCATION:14

            (D) OTHER INFORMATION:/mod_base= OTHER

                    /note= "5-methylcytosine"

    (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 8:

TTTTTCTCTC TCTCT   15

(2) INFORMATION FOR SEQ ID NO: 9:

    (i) SEQUENCE CHARACTERISTICS:

        (A) LENGTH: 15 base pairs

        (B) TYPE: nucleic acid

        (C) STRANDEDNESS: single

        (D) TOPOLOGY: linear

    (ii) MOLECULE TYPE: other nucleic acid

        (A) DESCRIPTION: /desc = "oligonucleotide"

    (ix) FEATURE:

        (A) NAME/KEY: misc_feature

        (B) LOCATION:5..14

        (D) OTHER INFORMATION:/note= "2'-substituted sugar"

    (ix) FEATURE:

        (A) NAME/KEY: modified_base

        (B) LOCATION:6

        (D) OTHER INFORMATION:/mod_base= OTHER

            /note= "5-methylcytosine"

    (ix) FEATURE:

        (A) NAME/KEY: modified_base

        (B) LOCATION:8

        (D) OTHER INFORMATION:/mod_base= OTHER

            /note= "5-methylcytosine"

    (ix) FEATURE:

        (A) NAME/KEY: modified_base

        (B) LOCATION:10

        (D) OTHER INFORMATION:/mod_base= OTHER

            /note= "5-methylcytosine"

    (ix) FEATURE:

(A) NAME/KEY: modified_base

(B) LOCATION:12

(D) OTHER INFORMATION:/mod_base= OTHER
          /note= "5-methylcytosine"

(ix) FEATURE:

(A) NAME/KEY: modified_base

(B) LOCATION:14

(D) OTHER INFORMATION:/mod_base= OTHER
          /note= "5-methylcytosine"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 9:

TTTTTCTCTC TCTCT   15

(2) INFORMATION FOR SEQ ID NO: 10:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 15 base pairs

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: other nucleic acid

(A) DESCRIPTION: /desc = "oligonucleotide"

(ix) FEATURE:

(A) NAME/KEY: misc_feature

(B) LOCATION:11

(D) OTHER INFORMATION:/note= "2'-substituted sugar"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 10:

AGAGAGAGAG AAAAA   15

(2) INFORMATION FOR SEQ ID NO: 11:

    (i) SEQUENCE CHARACTERISTICS:

        (A) LENGTH: 15 base pairs

        (B) TYPE: nucleic acid

        (C) STRANDEDNESS: single

        (D) TOPOLOGY: linear

    (ii) MOLECULE TYPE: other nucleic acid

        (A) DESCRIPTION: /desc = "oligonucleotide"

    (ix) FEATURE:

        (A) NAME/KEY: misc_feature

        (B) LOCATION:3

        (D) OTHER INFORMATION:/note= "2'-substituted sugar"

    (ix) FEATURE:

        (A) NAME/KEY: misc_feature

        (B) LOCATION:5

        (D) OTHER INFORMATION:/note= "2'-substituted sugar"

    (ix) FEATURE:

        (A) NAME/KEY: misc_feature

        (B) LOCATION:7

        (D) OTHER INFORMATION:/note= "2'-substituted sugar"

    (ix) FEATURE:

        (A) NAME/KEY: misc_feature

        (B) LOCATION:9

        (D) OTHER INFORMATION:/note= "2'-substituted sugar"

    (ix) FEATURE:

        (A) NAME/KEY: misc_feature

        (B) LOCATION:11

        (D) OTHER INFORMATION:/note= "2'-substituted sugar"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 11:

AGAGAGAGAG AAAAA   15

(2) INFORMATION FOR SEQ ID NO: 12:

    (i) SEQUENCE CHARACTERISTICS:

       (A) LENGTH: 15 base pairs

       (B) TYPE: nucleic acid

       (C) STRANDEDNESS: single

       (D) TOPOLOGY: linear

    (ii) MOLECULE TYPE: other nucleic acid

       (A) DESCRIPTION: /desc = "oligonucleotide"

    (ix) FEATURE:

       (A) NAME/KEY: misc_feature

       (B) LOCATION:11..14

       (D) OTHER INFORMATION:/note= "2'-substituted sugar"

    (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 12:

AGAGAGAGAG AAAAA   15

(2) INFORMATION FOR SEQ ID NO: 13:

    (i) SEQUENCE CHARACTERISTICS:

       (A) LENGTH: 15 base pairs

       (B) TYPE: nucleic acid

       (C) STRANDEDNESS: single

       (D) TOPOLOGY: linear

    (ii) MOLECULE TYPE: other nucleic acid

      (A) DESCRIPTION: /desc = "oligonucleotide"

 (ix) FEATURE:

      (A) NAME/KEY: misc_feature

      (B) LOCATION:2..11

      (D) OTHER INFORMATION:/note= "2'-substituted sugar"

                    -

 (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 13:

AGAGAGAGAG AAAAA   15

(2) INFORMATION FOR SEQ ID NO: 14:

  (i) SEQUENCE CHARACTERISTICS:

      (A) LENGTH: 13 base pairs

      (B) TYPE: nucleic acid

      (C) STRANDEDNESS: single

      (D) TOPOLOGY: linear

 (ii) MOLECULE TYPE: other nucleic acid

      (A) DESCRIPTION: /desc = "oligonucleotide"

 (ix) FEATURE:

      (A) NAME/KEY: misc_feature

      (B) LOCATION:4

      (D) OTHER INFORMATION:/note= "2'-substituted sugar"

 (ix) FEATURE:

      (A) NAME/KEY: misc_feature

      (B) LOCATION:6

      (D) OTHER INFORMATION:/note= "2'-substituted sugar"

 (ix) FEATURE:

      (A) NAME/KEY: misc_feature

          (B) LOCATION:12

          (D) OTHER INFORMATION:/note= "2'-substituted sugar"

     (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 14:

AGGTGTCCGC ATC   13

(2) INFORMATION FOR SEQ ID NO: 15:

     (i) SEQUENCE CHARACTERISTICS:

          (A) LENGTH: 16 base pairs

          (B) TYPE: nucleic acid

          (C) STRANDEDNESS: single

          (D) TOPOLOGY: linear

     (ii) MOLECULE TYPE: other nucleic acid

          (A) DESCRIPTION: /desc = "oligonucleotide"

     (ix) FEATURE:

          (A) NAME/KEY: misc_feature

          (B) LOCATION:13..15

          (D) OTHER INFORMATION:/note= "2'-substituted sugar"

     (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 15:

TCCAGGTGTC CGTTTC   16

(2) INFORMATION FOR SEQ ID NO: 16:

     (i) SEQUENCE CHARACTERISTICS:

          (A) LENGTH: 21 base pairs

          (B) TYPE: nucleic acid

          (C) STRANDEDNESS: single

          (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: other nucleic acid

      (A) DESCRIPTION: /desc = "target DNA"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 16:

GCTAAAAAGA GAGAGAGATC G   21

(2) INFORMATION FOR SEQ ID NO: 17:

    (i) SEQUENCE CHARACTERISTICS:

        (A) LENGTH: 21 base pairs

        (B) TYPE: nucleic acid

        (C) STRANDEDNESS: single

        (D) TOPOLOGY: linear

    (ii) MOLECULE TYPE: other nucleic acid

      (A) DESCRIPTION: /desc = "opposite strand of target
DNA"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 17:

CGATCTCTCT CTCTTTTTAG C   21

(2) INFORMATION FOR SEQ ID NO: 18:

    (i) SEQUENCE CHARACTERISTICS:

        (A) LENGTH: 20 base pairs

        (B) TYPE: nucleic acid

        (C) STRANDEDNESS: single

        (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: other nucleic acid

    (A) DESCRIPTION: /desc = "oligonucleotide"

(ix) FEATURE:

    (A) NAME/KEY: misc_feature

    (B) LOCATION:1..20

    (D) OTHER INFORMATION:/note= "phosphorothioate backbone"

(ix) FEATURE:

    (A) NAME/KEY: misc_feature

    (B) LOCATION:2

    (D) OTHER INFORMATION:/note= "2'-substituted sugar"

(ix) FEATURE:

    (A) NAME/KEY: misc_feature

    (B) LOCATION:4

    (D) OTHER INFORMATION:/note= "2'-substituted sugar"

(ix) FEATURE:

    (A) NAME/KEY: misc_feature

    (B) LOCATION:15

    (D) OTHER INFORMATION:/note= "2'-substituted sugar"

(ix) FEATURE:

    (A) NAME/KEY: misc_feature

    (B) LOCATION:17

    (D) OTHER INFORMATION:/note= "2'-substituted sugar"

(ix) FEATURE:

    (A) NAME/KEY: misc_feature

    (B) LOCATION:19

    (D) OTHER INFORMATION:/note= "2'-substituted sugar"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 18:

TCCCGCCTGT GACATGCATT   20

(2) INFORMATION FOR SEQ ID NO: 19:

    (i) SEQUENCE CHARACTERISTICS:
        (A) LENGTH: 20 base pairs
        (B) TYPE: nucleic acid
        (C) STRANDEDNESS: single
        (D) TOPOLOGY: linear

    (ii) MOLECULE TYPE: other nucleic acid
        (A) DESCRIPTION: /desc = "oligonucleotide"

    (ix) FEATURE:
        (A) NAME/KEY: misc_feature
        (B) LOCATION:6..15
        (D) OTHER INFORMATION:/note= "phosphorothioate backbone"

    (ix) FEATURE:
        (A) NAME/KEY: misc_feature
        (B) LOCATION:1..5
        (D) OTHER INFORMATION:/note= "2'-substituted sugar"

    (ix) FEATURE:
        (A) NAME/KEY: misc_feature
        (B) LOCATION:15..19
        (D) OTHER INFORMATION:/note= "2'-substituted sugar"

    (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 19:

TCCCGCCTGT GACATGCATT   20

(2) INFORMATION FOR SEQ ID NO: 20:

(i) SEQUENCE CHARACTERISTICS:

    (A) LENGTH: 20 base pairs

    (B) TYPE: nucleic acid

    (C) STRANDEDNESS: single

    (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: other nucleic acid

    (A) DESCRIPTION: /desc = "oligonucleotide"

(ix) FEATURE:

    (A) NAME/KEY: misc_feature

    (B) LOCATION:1..20

    (D) OTHER INFORMATION:/note= "phosphorothioate backbone"

(ix) FEATURE:

    (A) NAME/KEY: misc_feature

    (B) LOCATION:1..5

    (D) OTHER INFORMATION:/note= "2'-substituted sugar"

(ix) FEATURE:

    (A) NAME/KEY: misc_feature

    (B) LOCATION:15..19

    (D) OTHER INFORMATION:/note= "2'-substituted sugar"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 20:

TCCCGCCTGT GACATGCATT   20

(2) INFORMATION FOR SEQ ID NO: 21:

    (i) SEQUENCE CHARACTERISTICS:

        (A) LENGTH: 20 base pairs

        (B) TYPE: nucleic acid

        (C) STRANDEDNESS: single

        (D) TOPOLOGY: linear

    (ii) MOLECULE TYPE: other nucleic acid
         (A) DESCRIPTION: /desc = "oligonucleotide"

    (ix) FEATURE:
         (A) NAME/KEY: misc_feature
         (B) LOCATION:6..15
         (D) OTHER INFORMATION:/note= "phosphorothioate backbone"

    (ix) FEATURE:
         (A) NAME/KEY: misc_feature
         (B) LOCATION:1..5
         (D) OTHER INFORMATION:/note= "2'-substituted sugar"

    (ix) FEATURE:
         (A) NAME/KEY: misc_feature
         (B) LOCATION:15..19
         (D) OTHER INFORMATION:/note= "2'-substituted sugar"

    (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 21:

TCCCGCCTGT GACATGCATT   20

(2) INFORMATION FOR SEQ ID NO: 22:

    (i) SEQUENCE CHARACTERISTICS:
         (A) LENGTH: 20 base pairs
         (B) TYPE: nucleic acid
       . (C) STRANDEDNESS: single
         (D) TOPOLOGY: linear

    (ii) MOLECULE TYPE: other nucleic acid
         (A) DESCRIPTION: /desc = "oligonucleotide"

(ix) FEATURE:

    (A) NAME/KEY: misc_feature

    (B) LOCATION:1..20

    (D) OTHER INFORMATION:/note= "phosphorothioate backbone"

(ix) FEATURE:

    (A) NAME/KEY: misc_feature

    (B) LOCATION:1..5

    (D) OTHER INFORMATION:/note= "2'-substituted sugar"

(ix) FEATURE:

    (A) NAME/KEY: misc_feature

    (B) LOCATION:15..19

    (D) OTHER INFORMATION:/note= "2'-substituted sugar"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 22:

TCCCGCCTGT GACATGCATT   20